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HISTORICAL INFLATION PROGRAM (A COMPUTERIZED PROGRAM GENERATING--ETC(U)
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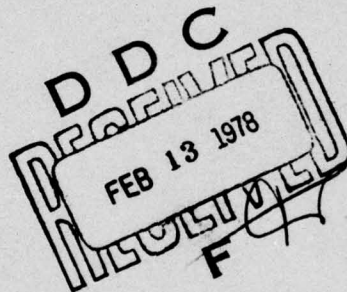
HISTORICAL INFLATION PROGRAM

(A COMPUTERIZED PROGRAM GENERATING
HISTORICAL INFLATION INDICES FOR THE
PROCUREMENT OF ARMY AIRCRAFT)

WARREN H. GILLE, JR.

FINAL REPORT

JANUARY 1978



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U.S. ARMY TROOP SUPPORT
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COMPTROLLER
COST ANALYSIS DIVISION
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report extends and revises Technical Report 76-1B which presents and describes the Historical Inflation Program, a computerized program generating historical inflation indices for the procurement of Army aircraft. The program can be updated monthly, is easily revised for changes in Bureau of Labor Statistics methods, and capable of handling data for all fiscal year formats. Output is expressed as monthly, quarterly, calendar year inflation indices (in Calendar Year 1967 base) and inflation factors (in any Fiscal Year base). This report contains updated tables of inflation factors, expressed in a FY 77 base.		

20. ABSTRACT

These indices and factors provide a means of adjusting historical cost data for the procurement of Army aircraft to constant year dollars. Additional features include: computations for the Derivation of Revised Weighting Factors, detailed indices enabling the adjustment of historical Labor and Material cost separately, a discussion of aggregate weighting factors for Labor and Materials, including trends from sensitivity analysis, and a more complete explanation, and additional documentation, aimed at making the report more useful to a larger cross section of the DOD community.

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Miss Anne Kondracki, Miss Mary Mager, and Miss Paula Smith not only provided excellent clerical support, but also even smiled occasionally amidst all the problems and hard work.

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I. APPLICABILITY. The inflation indices and factors published in this report are applicable to the adjustment of historical costs for the procurement of Army aircraft. These costs are currently funded by the Aircraft Procurement, Army appropriation.

II. AN OVERVIEW OF THE HISTORICAL INFLATION PROGRAM.

A. History.

The Historical Inflation Program for Army aircraft procurement was developed using a sequence of documents, the first being Aerospace Price Indices, by H. G. Campbell (RAND #R-568-PR, 12/70). Essentially, the RAND document established a basis for the construction of general indices, identified items of special interest and concern, and indicated that no substitute exists for thorough analysis of the specific items being characterized by an historical index. Several indices, designed specifically for rotary wing aircraft, have been developed for the adjustment of procurement cost since that time by the United States Army Aviation Systems Command, and this function has been carried over to the Aircraft Analysis Branch, Cost Analysis Division, Office of the Comptroller, USATSARCOM.

The current indices are based on research done in the period 1972 to date. In June 1973, the Office of the Comptroller, Cost Analysis Division, made a study of materials used in the Army helicopter systems then, or most recently, in production. Cost Information Reports were assembled, and contractors were requested to supply lists of materials for both airframe and engine, on the basis of contribution to weight. Contractor technical and engineering personnel provided assistance with data interpretation and definitions for those items whose composition was unclear from engineering documents and Detailed Weight Statements.

The following aircraft were selected:

UH-1H	OH-6A	AH-1G
CH-47C	OH-58A	CH-54B

These are currently deemed typical, for several reasons. First, the time period June 1973 is the center of the 1969-1977 range. Second, a number of these aircraft had been produced on a long term, continuing basis in previous versions. And, most important, they are among the systems most likely to be used in developing Cost Estimating Relationships for new systems by use of parametric techniques.

The September 1973 Historical Inflation Cost Research Report, cited in the references, was the first report to make full use of this information. It was updated by the August 1974 Cost Research Report, and then by a series of expanded analyses under current title, Historical Inflation Program, since that time. A list of the assumptions and changes in methodology over the period referenced are included in the body of the Technical Section.

B. Construction of Indices - Methodology.

The indices are developed by a stepwise, building process, which computes the contributions to cost on a weighted value-added basis.

1. First, the contribution to cost of small parts and other purchased equipment is calculated.
2. Next, this cost contribution of purchased parts is combined with that of raw materials to get the cost of purchased materials.
3. Purchased material cost is then combined with contractor

labor cost to compute the index for products such as engine or airframe.

4. The indices for engine, airframe, and avionics are combined to get an overall index for aggregate aircraft.

C. Indexing Technique.

The procedure used is "Cost-Weighting". The information obtained from 1973 research on "helicopter materials" established percentages based on weight. Because the indices used to track material costs are based on monetary considerations, (e.g., Wholesale Price Index; Wages, by Standard Industrial Code), percentages by weight had to be transformed into percentage contributions to cost, if WPI and SIC inflation factors were to be applied directly. Based on the premise of profit maximization, contractors should tend to minimize the use of expensive materials subject to maintaining acceptable performance standards; essentially, materials with a high cost per unit weight ratio would be used sparingly. Adjusting a percentage based on weight using a monetary index would not only result in an improper index initially, but also one with diminishing reliability. The latter bias is avoided by calculating the contribution to cost, instead of merely the contribution to weight.

D. Weighting Factors. Although the model is developed by an iterative, stepwise process, the revised weighting factors in the table (at the end of Appendix B) implicitly include all calculations. The index, as stated, is merely the direct sum of

the products of the weights and their corresponding material index values. The development of weighting factors is illustrated in the Technical Section.

E. Data. The data used appear in two different forms. Yearly data are presented by Calendar Year 1947 to date, and monthly data for 1967 to date. The yearly data, pre 1958, are condensed into three columns; the data for 1958 and later are presented in an 18 column format - 14 columns for material inputs, and 4 for labor. Beginning with report 76-1B, all columns of the data set will be identified by WPI and SIC code, as well as a verbal description in the column heading. PLEASE NOTE: The data, their characterization, and any redefinition, by the Bureau of Labor Statistics over the years, are tracked in line diagram C-2.

F. Validity and Firmness of Data.

The Wholesale Price Index and Wage Data was supplied by the Kansas City Regional Office of the Bureau of Labor Statistics, U.S. Department of Labor. The data comes in three types of published form: (1) a cumulative history covering all relevant past years on a monthly basis, (2) A yearly edition (such as Wage and Price Index Annual Supplement) which lists the previous 12 months, and (3), monthly publications which list the most current month and several other months for comparison.

For data to be "firm" it must be at least 18 months old, in most cases, because it is benchmarked and adjusted after the fact. For example, small samples are taken throughout the year; however, during one month (the benchmark month), a much more comprehensive

sample is taken. Due to its significantly larger sample size, the benchmark month's sample is felt to be more representative than those of other individual months, and if the benchmark diverges from the pattern, the other months are adjusted proportionately to conform to its base as benchmark.

The data in the cumulative history 'type' publication is felt to be firm or "final". Basically, such publications provide a chronological listing of all firm data available for the past history of those indices. However, the data in such publications is usually 18 to 24 months behind the current period. The data for each month listed in the Annual Supplements is not necessarily firm because benchmarks occur during the Calendar Year, and at different times for different series. Adjustments may not have been made before the Annual Supplements are published. The monthly publications which contain information on the most current periods, are even more tentative. In general, the Wholesale Price Index Data are firm before Wage Indices for the corresponding month, probably due to the fact that it is easier to define and measure price changes for commodities than for human skills.

G. Particular Problems.

1. The Wage Data during the period CY 1971 - CY 1973 has changed, in many cases, over the past 24 months. The wage-price freeze disallowed certain salary and wage increases, but a number of these were awarded on a retroactive basis based on legal decisions rendered several years after the fact. Since such payments involved costs directly attributable to labor services, that

component had to be included in the indices to get a meaningful measure of labor earnings.*

2. Possible discrepancies, such as the Engine Production Labor Value (SIC 3722) for Dec 75, were reviewed with BLS personnel and verified to be as stated. All data was verified to be the latest and most accurate available, according to information provided by BLS personnel on 28 December 1977.

H. Change in Content from the Previous Reports.

The printout of the computer program compilation used for the Historical Inflation Program is not included in this report, for two reasons. First, it was found that a list of structural equations would better serve the purpose of elucidating the model. At the same time, with the reduced form equations and clearly identifiable data sets, any index figure can be checked by direct calculation (See Appendix B, page B-4). Second, direct duplication of the deck from the original is more accurate and efficient than keypunching copies from the program source listing, should such an external need ever realistically develop.

A sensitivity analysis, which displays the effects resulting from a change in the relative weights of labor and material in the Historical Index, has been included in this revision. The percentage contribution to cost attributable to labor and materials varies among aircraft systems, and the values used in this report--.378 (materials) and .622 (labor)--are an average for the six

*See BLS Bulletin No. 1312-10, Employment and Earnings 1909-75 for a detailed explanation (esp. P. 769).

systems referenced. The sensitivity analysis yields a measure of the extent to which the index for a single aircraft system would vary, if that system is built with an aggregate labor/material mix which differs from the six system average. The accuracy of the reweighted index, however, also requires that the other assumptions be well satisfied--i.e., the 14 material and 4 labor indices are typical of the system being reviewed. Because such weighting is a concern in developing estimates in inflated dollars, the effect of such "weighting changes" should be of significant interest to many readers.

TECHNICAL SECTION

III. ANALYSIS: (TECHNICAL SECTION).

A. Chronology. Previous efforts related to the development of inflation indices include Aerospace Price Indexes by H. G. Campbell, RAND Corporation, December 1970 (Reference 1) and two Cost Research Reports: Historical Inflation Indices for Army Aircraft, Cost Analysis Division, Office of the Comptroller, US Army Aviation Systems Command, September 1973 (Reference 3), and Historical Inflation Indices for Army Aircraft, Cost Analysis Division, Office of the Comptroller, US Army Aviation Systems Command, August 1974 (Reference 4).

1. Characteristics of the RAND Report.

a. Specific Wholesale Prices and Price Indexes (Reference 7) and Employment and Earnings (Reference 2) data have been selected as proxy series for similar commodity and labor categories experienced in the procurement of Army aircraft. Aircraft inflation indices are constructed from a weighted average of these proxy series. The weighting factors for this average are derived from estimates of the relative contribution to the total aircraft cost made by each component (commodity or industry labor group) comprising the index. The index is thus a "cost-weighted" series.

b. A 2½ percent compounded annual rate for growth of overhead ratios is assumed.

c. No adjustment is made for productivity increases.

d. Indices are developed on a Calendar Year basis.

2. Characteristics of the September 1973 Cost Research Report.

a. As with the RAND Report, aircraft inflation indices have been constructed from a weighted average of Wholesale Prices and Price Indexes and Employment and Earnings data selected as proxy series for their similarity to those commodities and labor categories experienced in the procurement of Army aircraft. Weighting factors are proportional to the relative physical weights or masses, rather than the relative costs (as in the RAND Report), of commodities comprising the "composite material" portion of the index. Thus, the "composite material" portion of the index represents a "weight-weighted" series.

b. Like the RAND Report, a 2½ percent annual growth in the overhead ratio is assumed.

c. No adjustment is made for productivity increases.

d. Indices are developed on a Calendar Year basis.

e. For years for which certain specified Wholesale Price Indexes were unavailable, data has been projected from adjacent years.

3. Characteristics of the August 1974 Research Report.

a. As before, Wholesale Prices and Price Indexes and Employment and Earnings data have been selected as proxy series most similar to those commodities and labor categories experienced in the procurement of Army aircraft. The indices have been constructed from a weighted average of these proxy series utilizing the weighting factors used in the September 1973 Cost Research Report. The "composite material" portion of the index represents a "weight-weighted" series.

b. Unlike RAND and the September 1973 Cost Research Report, no adjustment for overhead growth is assumed.

c. No adjustment for productivity increases is assumed.

d. Indices have been extended to FY 1974 by assuming that data for the September 1973 Cost Research Report represented December and hence the Fiscal Year midpoint, rather than the annual average, of each calendar year.

e. For years for which certain specified Wholesale Price Indexes were unavailable, data has been projected from adjacent years.

B. Data Sources. Data sources for this report are Wholesale Prices and Price Indexes (reference 7) and Employment and Earnings (reference 2). To insure that the latest revisions were incorporated into the data base, data was obtained from the Bureau of Labor Statistics Information Center, and Annual Supplements to the Wholesale Prices and Price Indexes. For Employment and Earnings, data for any given month was obtained from the latest available source. Data used in this report are displayed in Appendices D, E, G, and H.

C. Methodology.

1. Overhead and Productivity Adjustments. On the basis of data covering a ten year period, the RAND Report concluded that there exists a secular growth trend of 2½ percent per year in the production overhead rate. The report also concludes that there has been little, if any, improvement in productivity to counteract the observed trend in overhead growth. This conclusion appears to be unwarranted, particularly in light of productivity gains recorded (as measured by Industrial Production Indices) for similar sectors of industry. Thus, in order not to unduly bias the results of the analysis, this report makes no adjustment for either overhead growth or improvements in productivity.

2. Revision of Weighting Factors. From a number of Cost Information Reports, the following weighting factors were developed and reported in the September 1973 Cost Research Report. For the Airframe:

(.378) Raw Material + (.622) Labor 3723,9 = Purchased Equipment
(.582) Purchased Equipment + (.418) Raw Material = Total Material
(.378) Total Material + (.622) Labor 3721 = Total Airframe

For the Engine:

(.599) Raw Material + (.401) Labor 3723,9 = Purchased Equipment
(.295) Purchased Equipment + (.705) Raw Material = Total Material
(.599) Total Material + (.401) Labor 3722 = Total Engines

And for Avionics:

(.315) Material + (.685) Labor 3674,9 = Total Avionics

In the previously published indices, the weighting factors used to develop the material portion of the indices were made proportional to the relative physical weights of the various commodities used in the construction of the aircraft. The material portion of these indices thus represent a "weight-weighted" series. In order to be consistent with the intended purposes of an inflation index, the methodology in this program uses index weighting factors proportional to the numerical products obtained from multiplying the relative physical commodity weights by the appropriate base year cost per pound. This yields a "cost-weighted" index giving more weight to such expensive commodities as titanium. Unfortunately, however, price per pound data are not published in Wholesale Prices and Price Indexes for each of the commodities used in constructing the indices. To overcome this difficulty, the per pound price is estimated from the available data of the most closely related commodities. To minimize the

effect from related commodities which have relatively little economic impact, each price per pound estimate has been developed from a weighted average of available data utilizing the Bureau of Labor Statistics 1975 revised relative weights published in the 1975 Annual Supplement to Wholesale Prices and Price Indexes. The available data then constitutes a weighted sample from which a surrogate price per pound is computed for the Wholesale Price series in question. See Appendix A for the Computations for the Derivation of these Revised Weighting Factors, along with their associated cost contribution per pound.

3. Construction of Indices.

a. Calendar Year 1967 has been taken as the base of these indices because this year represents the approximate midpoint of the period (1958-1977) for which the data supports the development of each of the indices, including those which account for avionics. Furthermore, 1967 conforms to the base used by the Bureau of Labor Statistics for Wholesale Price Indexes.

b. Appendix B contains the current Wholesale Price Index series, Earnings series, and the associated weighting factors used in the construction of the indices published in this report. Since some of these series have been in existence for only a limited time, other closely related series have been substituted with appropriate mathematical adjustments to insure continuity of the indices. This technique is considered preferable to the synthesis of data by projection from adjacent years. Appendix C depicts the historical flow and identifies the effective dates of series conversions, for the Wholesale Price Index and Earnings data

used in the development of the indices published in this report.

c. The term "aggregate" has been selected to indicate inflation indices applicable to the combined Airframe and Engine (aggregate Air Vehicle Excluding Avionics) and to the combined Airframe, Engine, and Avionics (Aggregate Air Vehicle Including Avionics) to avoid confusion with the term "composite" as in "composite escalation indices". Aggregate indices are based upon a standard 70-20-10 weighting (see Reference 5) of the Airframe, Engine and Avionics Indices respectively. Aggregate indices are intended for the adjustment of historical cost data for which the distribution of costs for the Airframe, Engine, and Avionics components is unavailable.

d. A new section depicting the raw material portion of the inflation indices is published as Appendix I. It is intended for applications requiring greater accuracy. Appropriate labor indices can be obtained from the Bureau of Labor Statistics Employment and Earnings series (Reference 2) as follows:

<u>Labor Category</u>	<u>SIC Code</u>	<u>Industry</u>
Airframe Contractor	3721	Aircraft
Airframe Subcontractor	3723, 9	Other aircraft parts and equipment
Engine Contractor	3722	Aircraft engines and engine parts
Engine Subcontractor	3723, 9	Other aircraft parts and equipment
Avionics	3674, 9	Other electronic components
Aggregate Air Vehicle Excluding Avionics	372	Aircraft and parts

e. The basic computational methodology is as follows:

(1) For Components : Airframe, Engine, and Avionics.

(a) Calendar Year indices are computed using sum of weighted calendar year labor and material indices.

(b) Fiscal Year indices are computed in a manner similar to Calendar Year, but the yearly fiscal averages are generated from the monthly data.

(c) Quarterly Indices - three months are averaged from monthly data set.

(d) Monthly - direct calculations using monthly data. A weighted average of monthly figures computed in the same manner as calendar year indices.

(2) Aggregate Vehicle.

(a) Aggregate Vehicle without Avionics = $\frac{(.7) \text{ Airframe} + (.2) \text{ Engine}}{.9}$

(b) Total Vehicle = .9(Agg. W/o) + (.1) Avionics

$$\begin{aligned} &= (.9) \left[\frac{(.7) \text{ Airframe} + (.2) \text{ Engine}}{.9} \right] + (.1) \text{ Avionics} \\ &= .70 \text{ Airframe} + .20 \text{ Engine} + .10 \text{ Avionics} \\ &\quad (70-20-10) \text{ as stated.} \end{aligned}$$

(3) Reduced form equations are specified in Appendix B-3.

IV. DESCRIPTION OF COMPUTER PROGRAM AND ASSOCIATED APPENDICES. The Historical Inflation Program is a computerized program for generating historical inflation indices for the procurement of Army aircraft. Appendices D and G contain the annual data used by the program, while the monthly data, commencing July 1967, are in Appendices E and H. Wholesale Price Index and Earnings data in these Appendices have been arrayed into columns with the same numerical code sequence used in Appendix B. Historical inflation indices and factors are published in Appendix F. Fiscal Year, quarterly, and monthly indices have been developed from the appropriate monthly data. A section containing the raw material portion only of these indices is published as Appendix I. The labor portion of these indices may be obtained by applying the methodology described in paragraph III.C. 3. d, to the data contained in Appendices D and E. Appendix J contains a sensitivity analysis which displays the effect on the indices resulting from changing the labor to material ratio, in terms of percentage contribution to cost.

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APPENDIX A
COMPUTATIONS FOR THE DERIVATION
OF REVISED WEIGHTING FACTORS
FOR THE HISTORICAL INFLATION PROGRAM

COMPUTATIONS FOR THE DERIVATION OF
REVISED WEIGHTING FACTORS
FOR THE HISTORICAL INFLATION PROGRAM

<u>WPI Code</u>	<u>Commodity¹</u>	<u>1967 Price Per Pound</u>	<u>Weight²</u>	<u>Product³</u>	<u>Weighted⁴ 1967 Price Per Pound</u>
07	<u>RUBBER AND PLASTIC PRODUCTS</u>				.2376
07 11 01 01	Latex	.2642	.006	.001585	
02	No. 1 Ribbed Smoked Sheets	.1992	.009	.001793	
03	No. 2 Ribbed Smoked Sheets	.1951	.021	.004097	
04	No. 3 Amber Blanket	.1820	.021	.003822	
02 11	Butyl, Regular	.25	.012	.003	
12	Neoprene, GN Type	.41	.020	.008199	
13	Styrene Butadiene, Hot	.2224	.021	.004671	
15	Polybutadiene, Non-Staining	.2476	.009	.002228	
03 21	Whole Tire Reclaim	.113	.009	.001017	
			.128	.030412	
10 13 02 62	<u>SHEETS, C.R., CARBON</u>	.0737			.0737
10 13 02 64	<u>SHEETS, C.R., STAINLESS</u>	.5531			.5531
10 15 01 41	<u>STEEL CASTINGS</u>				
10 15 01 53	<u>CLOSED DIE FORGINGS</u>				
10 15 01 11	Ingot Molds	.0497			.0497
10 22 01 11	<u>LEAD, PIG, COMMON</u>	.14			.14
10 22 01 51	<u>MAGNESIUM, PIG INGOT</u>	.3595			.3595
10 25 01 01	<u>ALUMINUM SHEET</u>	.4185			.4185

<u>WPI Code</u>	<u>Commodity¹</u>	<u>1967 Price Per Pound</u>	<u>Weight²</u>	<u>Product³</u>	<u>Weighted⁴ 1967 Price Per Pound</u>
10 25 01 13	<u>ROD, SCREW, MACHINE STOCK</u>	.6315			.6315
10 25 01 17	<u>EXTRUSION, SOLID CIRCLE SIZE 4 TO 5</u>				
10 25 01 13	<u>Rod, Screw, Machine Stock</u>	.6315			.6315
10 25 02	<u>COPPER AND BRASS MILL SHAPES</u>				.6216
31	<u>Cartridge Brass Strip, 70-30 Alloy</u>	.6033	.121	.073	
32	<u>Yellow Brass Rod (62-35-3 Alloy)</u>	.4602	.082	.03774	
33	<u>Yellow Brass Tube (70-30 Alloy)</u>	.7841	.048	.03764	
55	<u>Copper Sheet or Strip</u>	.6924	.108	.07478	
			.359	.22316	
10 25 04 63	<u>MONEL SHEET, CR 400 ALLOY</u>	1.3752			1.3752
10 25 05	<u>TITANIUM MILL SHAPES⁵</u>				5.2926
25	<u>Titanium Bar, Ground, 6AL-AV</u>	5.2926			

NOTES: 1. Capitalized and Underlined Commodity Titles indicate WPI Series actually used in the Historical Inflation Program.

2. Weight is Bureau of Labor Statistics Revised Relative Weight for the Wholesale Price Index. Source: 1975 Annual Supplement to Wholesale Prices and Price Indexes.

3. $\text{Product} = (\text{1967 Price Per Pound}) \times (\text{Weight})$.

4. $\text{Weighted 1967 Price Per Pound} = \frac{\text{Products}}{\text{Weights}}$

NOTES (Continued):

5. 1967 Titanium Bar Price Per Pound computed by utilizing Titanium Sponge index as surrogate for 1967 - Dec 1970. Titanium Mill Shapes index established December 1970. Titanium Sponge index for December 1970 is 95.5.

Figures may not compute due to rounding.

COMPUTATIONS FOR THE DERIVATION OF
REVISED WEIGHTING FACTORS
FOR THE HISTORICAL INFLATION PROGRAM

WPI Code	Commodity	contrib. to weight		contrib. to cost		1967 COST		contr. to cost per lb.		contr. to cost weighting factors	
		Airframe	Engine	Airframe	Engine	Per Pound		Airframe	Engine	Airframe	Engine
07	Rubber and Plastic Products	.17	.012	.04039	.00285	.2376		.0211	.0023	.0211	.0023
10 13 02 62	Sheets, C.R., Carbon	.055	.584	.00405	.32301	.0737		.0021	.2625	.0021	.2625
10 13 02 64	Sheets, C.R., Stainless	.22	.146	.01093	.00725	.5531		.0057	.0059	.0057	.0059
10 15 01 41	Steel Castings	.01	.077	.0014	.02768	.0497		.0007	.0225	.0007	.0225
10 15 01 53	Closed Die Forgings	.033	.021	.01186	.00879	.14		.0062	.0071	.0062	.0071
10 22 01 11	Lead, Pig, Common	.256	.004	.10715	.00253	.3595		.0560	.0021	.0560	.0021
10 22 01 51	Magnesium, Pig Ingot	.043	.005	.02715	.00632	.4185		.0142	.0051	.0142	.0051
10 25 01 01	Aluminum Sheet	.128	.122	.08083	.00311	.6315		.0422	.0025	.0422	.0025
10 25 01 13	Rod, Screw, Machine Stock	.049	.019	.03046	.16777	.6216		.0159	.1364	.0159	.1364
10 25 01 17	Extrusion, Solid Circle Size 4 to 5	.011	.019	.03046	.16777	1.3752		.0079	.0817	.0079	.0817
10 25 02	Copper and Brass Mill Shapes	.025	.019	.13231	.10056	5.2926		.0691	.0817	.0691	.0817
10 25 04 63	Monel Sheet, CR 400 Alloy										
10 25 05	Titanium Mill Shapes										
		1.000	1.000	.46167	.64986			.2411	.5281		

A5

NOTE: Revised Weighting Factors Proportional to Cost Contribution Per Pound.

Previous Weighting Factors expressed as a proportion of "composite material" index.

Revised Weighting Factors expressed as a proportion of the total index.

Previous Technical Report (TR 76-1) omitted nickel component (represented by Monel Sheet) from Engine index.

COMPUTATIONAL
FORMULA

$$\left[\begin{array}{l} \text{CONTRIBUTION TO WEIGHT :} \\ \text{PREVIOUS WEIGHTING FACTORS} \end{array} \right] \times \left[\begin{array}{l} 1967 \text{ COST} \\ \text{PER LB.} \end{array} \right] \times \left[\begin{array}{l} \text{ADJUSTMENT FACTOR} \\ \text{FOR} \\ \text{(RELATIVE IMPORTANCE} \\ \text{OF MATERIAL (RAW)} \\ \text{IN OVERALL INDEX)} \end{array} \right] = \left[\begin{array}{l} \text{RAW MATERIAL} \\ \text{CONTRIBUTION TO COST} \\ \text{WEIGHTING FACTORS.} \end{array} \right]$$

APPENDIX B
WHOLESALE PRICE INDEXES AND EARNINGS SERIES
USED IN
HISTORICAL INFLATION PROGRAM
WITH REVISED WEIGHTING FACTORS

WHOLESALE PRICE INDEXES AND EARNINGS SERIES
USED IN HISTORICAL INFLATION PROGRAM AND
REVISED WEIGHTING FACTORS

<u>Var</u>	<u>WPI Code</u>	<u>Commodity</u>	<u>Airframe</u>	<u>Engine</u>	<u>Avionics</u>	<u>Remarks</u>
(1)	07	Rubber and Plastic Products	.0211	.0023		
(2)	10 13 02 62 .04	Sheets, C.R., Carbon	.0021			
(3)	10 13 02 64	Sheets, C.R., Stainless		.2625		
(4)	10 15 01 41 .05	Steel Castings	.0057			
(5)	10 15 01 53 .06	Closed Die Forgings		.0059		
(6)	10 22 01 11	Lead, Pig, Common	.0007			
(7)	10 22 01 51	Magnesium, Pig Ingot	.0062	.0225		
(8)	10 25 01 01 .02	Aluminum Sheet	.0560	.0071		
(9)	10 25 01 13	Rod, Screw, Machine Stock	.0142	.0021		
(10)	10 25 01 17 .02	Extrusion, Solid Circle Size 4 to 5	.0422	.0051		
(11)	10 25 02	Copper and Brass Mill Shapes	.0159	.0025		
(12)	10 25 04 63	Monel Sheet, CR 400 Alloy **	.0079	.1364		
(13)	10 25 05	Titanium Mill Shapes	.0691	.0817		
(14)	11 78	Electronic Components			.3150	** MONEL METAL Previous Technical Report (TR 76-1) omitted nickel component from Engine Index Multiply Dec 70 Based Index by .955 to convert to 67 Base
<u>SIC Code</u>						
(15)	3674,9	Other Electronic Components			.6850	
(16)	3721	Aircraft	.6220			
(17)	3722	Aircraft Engines and Engine Parts		.4010		
(18)	3723,9	Other Aircraft Parts and Equipment	.1369	.0709		
			1.0000	1.0000	1.0000	

COMPUTATIONAL FORMULAS : Labor Cost Indexes

The data concerning cost of labor services is supplied by the Bureau of Labor Statistics, as hourly wage rates by Standard Industry Codes, and is reported on a regular basis in Employment and Earnings. Because the material indices are percentages, and wages are expressed in dollars/hour, labor cost must be converted to a percentage (index) before calculations can be made. The dollar to percentage conversions for the labor categories are

made as follows:

	<u>SIC Code</u>	<u>Industry</u>				
(15)	3674,9	Other Electronic Components	Current Hr. Wage	\div	2.34	X 100% = INDEX
(16)	3721	Aircraft Production Workers	Current Hr. Wage	\div	3.49	X 100% = INDEX
(17)	3722	Aircraft Engines and Engine Parts.	Current Hr. Wage	\div	3.42	X 100% = INDEX
(18)	3723,9	Other Aircraft Parts and Equipment.	Current Hr. Wage	\div	3.35	X 100% = INDEX

REDUCED FORM EQUATION

$$\begin{aligned} \text{Airframe} = & .0211 (V-1) + .0021 (V-2) + .0057 (V-4) + .0007 (V-6) \\ & + .0062 (V-7) + .056 (V-8) + .0142 (V-9) + .0422 (V-10) \\ & + .0159 (V-11) + .0079 (V-12) + .0691 (V-13) + .622 (V-16) (100/3.49) \\ & + .1369 (V-18) (100/3.35) \end{aligned}$$

$$\begin{aligned} \text{Engine} = & .0023 (V-1) + .2625 (V-3) + .0059 (V-5) + .0225 (V-7) \\ & + .0071 (V-8) + .0021 (V-9) + .0051 (V-10) + .0025 (V-11) \\ & + .1364 (V-12) + .0817 (V-13) + .401 (V-17) (100/3.42) \\ & + .0709 (V-18) (100/3.35) \end{aligned}$$

$$\text{Avionics} = .3150 (V-14) + .6850 (V-15) (100/2.34)$$

Variables (V-1) thru (V-18)
are defined on page B-2

DATA/DEVELOPMENT

- (1) Calendar Year Data - As given on printout.
- (2) Monthly Data - As specified on printout.
- (3) Quarterly Data - Development from Monthly.

$$\text{Quarterly} = \frac{[(\text{Monthly}_{T-1}) + (\text{Monthly}_T) + (\text{Monthly}_{T+1})]}{3}$$
- (4) Fiscal Year Data - Developed using appropriate quarterly data.

$$\begin{aligned} \text{Fiscal Year Average} &= \frac{Q1 + Q2 + Q3 + Q4}{4} \\ &(\text{Quarters of Fiscal Year}) \end{aligned}$$

Variables specified on preceding chart.

Numerical Coefficient for Titanium Index
(V-13) must be multiplied by .955 for data
after DEC 1970 due to change in definition
of products by the Bureau of Labor Statistics.
ADJUSTED COEFF. = .0691 (.955) = .0660

NOTE :

APPENDIX C

HISTORICAL FLOW OF WHOLESALE PRICE INDEXES AND
EARNINGS SERIES USED IN HISTORICAL INFLATION
PROGRAM WITH REVISED WEIGHTING FACTORS

HISTORICAL FLOW OF WHOLESALE PRICE INDEXES
AND EARNINGS SERIES USED IN HISTORICAL
INFLATION PROGRAM

Index	Calendar Year	WPI Code
	47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76	07
Rubber and Plastic Products		10 13 02 62
Metals and Metal Products		10 13 02 64
Steel Sheets		10 15 01 41
Stainless Steel Sheets		10 15 01 53
Steel Castings		10 22 01 11
Alloy Steel Forgings		10 22 01 51
Lead		10 22 01 56
Magnesium Ingot		10 25 01 01
Aluminum Sponges		10 25 01 13
Aluminum Shapes		10 25 01 17
Aluminum Sheet		10 25 04 63
Aluminum Rod		10 25 05
Aluminum Extrusion		11
Copper and Brass Mill Shapes		11 7
Nickel Sheet		11 78
Titanium Mill Sheets		
Machinery and Equipment		
Electrical Machinery and Equipment		
Electronic Components		

Industry	SIC Code
Electronic Components	3674,9
Aircraft and Parts	372
Aircraft	3721
Aircraft Engines	3722
Other Aircraft	3723,9

APPENDIX D

ANNUAL DATA FOR THE HISTORICAL INFLATION PROGRAM FOR U. S.
ARMY ROTARY WING AIRCRAFT

1 2 3

ANNUAL CALENDAR YEAR

DATA

pre '58
three
inputs
only.

	1	2	3	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
47	70.5	54.9	1.372																		
48	72.5	62.5	1.427																		
49	70.5	63.0	1.560																		
50	85.9	64.3	1.637																		
51	105.4	72.8	1.740																		
52	95.2	73.9	1.840																		
53	89.1	74.3	1.900																		
54	90.4	74.4	2.070																		
55	102.4	82.1	2.146																		
56	103.8	89.2	2.270																		
57	103.4	91.0	2.320																		
58	103.40	93.10	125.70	3.20	93.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
59	102.90	94.70	121.20	44.40	94.40	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
60	103.10	94.70	120.20	46.80	94.80	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
61	99.20	94.70	114.50	47.00	97.00	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
62	94.30	94.70	115.40	47.00	97.00	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
63	96.90	96.90	107.00	47.00	97.00	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
64	95.50	98.00	74.40	47.10	97.10	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
65	95.90	98.00	71.40	48.10	98.10	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
66	97.90	98.00	91.20	48.00	97.00	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20	107.20
67	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
68	103.40	104.70	103.10	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70	102.70
69	105.30	104.50	112.50	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40	103.40
70	109.30	114.40	130.90	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50	119.50
71	109.10	123.40	135.00	125.30	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70	122.70
72	109.30	133.60	124.40	125.00	120.50	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40	109.40
73	112.40	135.30	122.10	122.20	134.70	117.00	104.40	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20	105.20
74	134.20	167.60	157.10	163.90	161.90	154.10	173.20	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40	174.40
75	150.20	189.30	145.30	164.80	161.90	154.00	223.10	152.60	145.40	145.40	145.40	145.40	145.40	145.40	145.40	145.40	145.40	145.40	145.40	145.40	145.40
76	129.20	205.00	148.00	214.30	214.20	143.80	249.00	175.10	153.50	153.50	153.50	153.50	153.50	153.50	153.50	153.50	153.50	153.50	153.50	153.50	153.50

LABOR RATE DATA

MATERIAL COST DATA

APPENDIX E

MONTHLY DATA FOR THE HISTORICAL INFLATION PROGRAM :

MATERIALS

[illegible]

APPENDIX F

HISTORICAL INFLATION INDICES :

HISTORICAL INFLATION PRE-1958 INDICES

AGGREGATE AIR VEHICLE EXCLUDING AVIONICS

INDEX	FACTOR
CY67=	FY77=
100.0	1.0000
---	---
49.1	4.0033
54.2	3.6231
55.9	3.5178
58.9	3.3369
64.9	3.0297
67.0	2.9397
69.8	2.8170
71.6	2.7437
75.6	2.6010
80.4	2.4441
82.7	2.3769

ENGINE PRODUCTION

INDEX	FACTOR
CY67=	FY77=
100.0	1.0000
---	---
55.2	1.6802
61.8	1.2879
63.1	1.2184
66.4	1.0400
73.3	2.7701
74.9	2.7122
77.8	2.4094
79.3	2.5401
84.0	2.4173
90.2	2.2515
92.5	2.1958

AIRFRAME PRODUCTION

INDEX	FACTOR
CY67=	FY77=
100.0	1.0000
---	---
47.3	4.1108
52.1	3.7467
53.8	3.6181
54.8	3.4294
62.4	3.1167
64.7	3.0082
67.5	2.8454
69.4	2.8037
73.1	2.6613
77.6	2.5081
79.9	2.4368

CY 47 48 49 50 51 52 53 54 55 56 57

HISTORICAL INFLATION CALENDAR YEAR INDICES

	AIRFRAME PRODUCTION		ENGINE PRODUCTION		AVIONICS PRODUCTION		AGGREGATE AIR VEHICLE EXCLUDING AVIONICS		AGGREGATE AIR VEHICLE INCLUDING AVIONICS	
	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=
67	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000
68	82.4	2.3610	94.2	2.1544	81.5	1.9775	85.0	1.1880	84.7	2.2786
69	83.3	2.3370	92.6	2.1923	83.2	1.9388	85.4	1.1880	85.1	2.2666
70	85.3	2.2423	95.5	2.1260	85.4	1.8882	87.6	1.1880	87.3	2.2096
71	86.0	2.2438	95.4	2.1232	87.4	1.8440	88.1	1.1880	88.1	2.1915
72	87.1	2.2336	95.9	2.1143	88.1	1.8294	89.1	1.1880	89.0	2.1687
73	88.0	2.2107	94.4	2.1511	89.0	1.8116	89.5	1.1880	89.4	2.1584
74	89.2	2.1822	92.3	2.1906	91.1	1.7490	89.9	1.1880	90.0	2.1440
75	92.3	2.1081	92.7	2.1903	92.4	1.7410	94.4	1.1880	92.4	2.0878
76	96.5	2.0175	95.5	2.1266	95.5	1.6887	95.3	1.1880	95.2	2.0065
77	100.0	1.9463	100.0	2.0308	100.0	1.6122	100.0	1.1880	100.0	1.9298
78	103.8	1.8750	104.6	1.9615	104.1	1.5481	104.0	1.1880	104.0	1.8556
79	110.4	1.7433	111.1	1.8272	108.1	1.4911	110.6	1.1880	110.3	1.7495
80	116.9	1.6555	121.8	1.6672	113.2	1.4263	116.0	1.1880	117.5	1.6426
81	120.8	1.6106	127.4	1.5919	117.4	1.3728	122.3	1.1880	121.8	1.5838
82	128.9	1.5097	130.7	1.5533	121.0	1.3327	129.3	1.1880	128.5	1.5019
83	137.7	1.4130	135.3	1.5015	125.4	1.2857	137.2	1.1880	136.0	1.4188
84	154.0	1.2540	157.2	1.2926	136.3	1.2002	154.7	1.1880	152.7	1.3441
85	172.0	1.1316	178.1	1.1601	144.2	1.1031	173.4	1.1880	170.4	1.1309
86	184.6	1.0545	189.7	1.0704	152.4	1.0567	185.7	1.1880	182.4	1.0581

HISTORICAL INFLATION MONTHLY INDICES

				AIRCRAFT PRODUCTION			ENGINE PRODUCTION			AVIONICS PRODUCTION			AGGREGATE AIR VEHICLE EXCLUDING AVIONICS			AGGREGATE AIR VEHICLE INCLUDING AVIONICS		
QY	FY	INDEX	FACTOR	INDEX	FACTOR	INDEX	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR
		CY67=	FY77=	CY67=	FY77=	CY67=	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL	67	68	1.9602	100.4	2.0422	100.5	100.5	1.6038	100.5	1.6038	99.3	1.9785	99.4	1.9406	99.4	1.9406	99.4	1.9406
AUG	67	68	1.9394	100.0	2.0312	100.2	100.2	1.6090	100.2	1.6090	100.3	1.9599	100.3	1.9286	100.3	1.9286	100.3	1.9286
SEP	67	68	1.9335	100.4	2.0231	100.1	100.1	1.6100	100.1	1.6100	100.6	1.9534	100.6	1.9192	100.6	1.9192	100.6	1.9192
OCT	67	68	1.9246	102.1	1.9884	100.7	100.7	1.6012	100.7	1.6012	101.4	1.9384	101.4	1.9052	101.4	1.9052	101.4	1.9052
NOV	67	68	1.9071	102.3	1.9657	100.9	100.9	1.5980	100.9	1.5980	102.1	1.9246	102.1	1.8923	102.1	1.8923	102.1	1.8923
DEC	67	68	1.8935	103.2	1.9481	102.0	102.0	1.5803	102.0	1.5803	102.9	1.9101	102.9	1.8774	102.9	1.8774	102.9	1.8774
JAN	68	68	1.8891	103.5	1.9425	102.4	102.4	1.5723	102.4	1.5723	102.7	1.9133	102.7	1.8793	102.7	1.8793	102.7	1.8793
FEB	68	68	1.8842	103.3	1.9348	103.3	103.3	1.5643	103.3	1.5643	102.8	1.9109	102.8	1.8757	102.8	1.8757	102.8	1.8757
MAR	68	68	1.8872	103.8	1.9444	103.2	103.2	1.5618	103.2	1.5618	102.9	1.9105	102.9	1.8755	102.9	1.8755	102.9	1.8755
APR	68	68	1.9094	103.0	1.9722	102.7	102.7	1.5492	102.7	1.5492	102.1	1.9238	102.1	1.8801	102.1	1.8801	102.1	1.8801
MAY	68	68	1.9012	104.1	1.9514	103.4	103.4	1.5455	103.4	1.5455	102.8	1.9125	102.8	1.8765	102.8	1.8765	102.8	1.8765
JUN	68	68	1.8937	104.4	1.9444	104.1	104.1	1.5446	104.1	1.5446	103.1	1.9052	103.1	1.8692	103.1	1.8692	103.1	1.8692
JUL	68	69	1.8937	104.5	1.9444	104.1	104.1	1.5446	104.1	1.5446	103.2	1.9050	103.2	1.8691	103.2	1.8691	103.2	1.8691
AUG	68	69	1.8741	104.2	1.9300	104.7	104.7	1.5404	104.7	1.5404	104.1	1.8809	104.1	1.8521	104.1	1.8521	104.1	1.8521
SEP	68	69	1.8579	105.3	1.9234	105.0	105.0	1.5361	105.0	1.5361	104.9	1.8737	104.9	1.8399	104.9	1.8399	104.9	1.8399
OCT	68	69	1.8426	105.4	1.9184	105.2	105.2	1.5318	105.2	1.5318	106.4	1.8475	106.4	1.8103	106.4	1.8103	106.4	1.8103
NOV	68	69	1.8194	105.8	1.9184	105.9	105.9	1.5229	105.9	1.5229	106.7	1.8414	106.7	1.8098	106.7	1.8098	106.7	1.8098
DEC	68	69	1.8133	107.1	1.8959	104.2	104.2	1.5187	104.2	1.5187	107.3	1.8314	107.3	1.8006	107.3	1.8006	107.3	1.8006
JAN	69	69	1.8111	108.1	1.8797	104.1	104.1	1.5196	104.1	1.5196	107.4	1.8262	107.4	1.7960	107.4	1.7960	107.4	1.7960
FEB	69	69	1.7844	108.2	1.8772	107.4	107.4	1.5014	107.4	1.5014	108.6	1.8068	108.6	1.7766	108.6	1.7766	108.6	1.7766
MAR	69	69	1.7872	108.1	1.8784	107.2	107.2	1.5046	107.2	1.5046	108.7	1.8074	108.7	1.7775	108.7	1.7775	108.7	1.7775
APR	69	69	1.7817	108.4	1.8724	106.9	106.9	1.5078	106.9	1.5078	109.1	1.8018	109.1	1.7729	109.1	1.7729	109.1	1.7729
MAY	69	69	1.7816	109.2	1.8632	107.8	107.8	1.4955	107.8	1.4955	109.2	1.7997	109.2	1.7686	109.2	1.7686	109.2	1.7686
JUN	69	69	1.7799	110.3	1.8414	108.1	108.1	1.4915	108.1	1.4915	109.6	1.7937	109.6	1.7638	109.6	1.7638	109.6	1.7638
JUL	69	70	1.7404	110.4	1.8360	108.4	108.4	1.4879	108.4	1.4879	109.6	1.7931	109.6	1.7629	109.6	1.7629	109.6	1.7629
AUG	69	70	1.7517	110.6	1.8322	108.7	108.7	1.4835	108.7	1.4835	111.0	1.7896	111.0	1.7415	111.0	1.7415	111.0	1.7415
SEP	69	70	1.7431	110.9	1.8312	109.4	109.4	1.4730	109.4	1.4730	110.4	1.7783	110.4	1.7480	110.4	1.7480	110.4	1.7480
OCT	69	70	1.7331	115.5	1.7582	109.2	109.2	1.4741	109.2	1.4741	113.0	1.7388	113.0	1.7133	113.0	1.7133	113.0	1.7133
NOV	69	70	1.7109	115.4	1.7404	109.4	109.4	1.4708	109.4	1.4708	114.1	1.7260	114.1	1.6978	114.1	1.6978	114.1	1.6978
DEC	69	70	1.6984	119.4	1.7008	110.4	110.4	1.4404	110.4	1.4404	115.7	1.6990	115.7	1.6761	115.7	1.6761	115.7	1.6761
JAN	70	70	1.6933	120.4	1.6472	111.0	111.0	1.4527	111.0	1.4527	116.2	1.6919	116.2	1.6689	116.2	1.6689	116.2	1.6689
FEB	70	70	1.6927	120.4	1.6469	110.9	110.9	1.4538	110.9	1.4538	116.2	1.6913	116.2	1.6686	116.2	1.6686	116.2	1.6686
MAR	70	70	1.6914	120.7	1.6428	111.5	111.5	1.4462	111.5	1.4462	116.3	1.6896	116.3	1.6662	116.3	1.6662	116.3	1.6662
APR	70	70	1.6870	120.7	1.6431	111.4	111.4	1.4408	111.4	1.4408	116.6	1.6861	116.6	1.6624	116.6	1.6624	116.6	1.6624
MAY	70	70	1.6819	121.1	1.6479	112.5	112.5	1.4328	112.5	1.4328	116.9	1.6808	116.9	1.6568	116.9	1.6568	116.9	1.6568
JUN	70	70	1.6799	121.5	1.6470	113.4	113.4	1.4198	113.4	1.4198	117.1	1.6778	117.1	1.6527	117.1	1.6527	117.1	1.6527
JUL	70	71	1.6764	121.4	1.6472	114.1	114.1	1.4125	114.1	1.4125	117.4	1.6743	117.4	1.6487	117.4	1.6487	117.4	1.6487
AUG	70	71	1.6700	122.4	1.6418	114.4	114.4	1.4097	114.4	1.4097	118.9	1.6696	118.9	1.6436	118.9	1.6436	118.9	1.6436
SEP	70	71	1.6637	122.4	1.6410	115.1	115.1	1.4006	115.1	1.4006	119.6	1.6637	119.6	1.6397	119.6	1.6397	119.6	1.6397
OCT	70	71	1.6541	122.9	1.6310	115.1	115.1	1.3920	115.1	1.3920	120.5	1.6541	120.5	1.6314	120.5	1.6314	120.5	1.6314
NOV	70	71	1.6480	123.4	1.6249	116.7	116.7	1.3815	116.7	1.3815	121.3	1.6480	121.3	1.6249	121.3	1.6249	121.3	1.6249
DEC	70	71	1.6419	124.9	1.6259	116.7	116.7	1.3747	116.7	1.3747	121.0	1.6419	121.0	1.6245	121.0	1.6245	121.0	1.6245
JAN	71	71	1.6235	124.7	1.6280	117.3	117.3	1.3747	117.3	1.3747	120.8	1.6235	120.8	1.6021	120.8	1.6021	120.8	1.6021
FEB	71	71	1.6274	125.1	1.6233	117.1	117.1	1.3743	117.1	1.3743	120.7	1.6274	120.7	1.5983	120.7	1.5983	120.7	1.5983
MAR	71	71	1.6251	125.7	1.6215	117.4	117.4	1.3714	117.4	1.3714	121.1	1.6251	121.1	1.5859	121.1	1.5859	121.1	1.5859
APR	71	71	1.6226	125.8	1.6214	117.7	117.7	1.3702	117.7	1.3702	121.3	1.6226	121.3	1.5832	121.3	1.5832	121.3	1.5832
MAY	71	71	1.6061	124.4	1.6061	117.4	117.4	1.3683	117.4	1.3683	122.3	1.6061	122.3	1.5692	122.3	1.5692	122.3	1.5692
JUN	71	71	1.6124	128.5	1.5802	118.2	118.2	1.3438	118.2	1.3438	122.4	1.6124	122.4	1.5619	122.4	1.5619	122.4	1.5619

JUL	71	72	120.4	1.6141	124.7	1.5774	114.0	1.3440	122.4	1.6055	122.0	1.5424
AUG	71	72	121.2	1.6064	124.9	1.5757	118.0	1.3444	122.4	1.5972	122.4	1.5768
SEP	71	72	121.6	1.6004	124.8	1.5772	114.2	1.3645	123.2	1.5950	122.7	1.5728
OCT	71	72	122.1	1.5944	124.2	1.5719	117.0	1.3782	123.0	1.5893	123.0	1.5692
NOV	71	72	122.7	1.5869	124.5	1.5680	117.2	1.3755	124.2	1.5820	123.5	1.5624
DEC	71	72	123.2	1.5795	130.4	1.5674	114.4	1.3422	124.4	1.5744	124.2	1.5542
JAN	72	72	123.4	1.5704	130.1	1.5604	114.9	1.3559	124.3	1.5611	123.7	1.5595
FEB	72	72	123.6	1.5644	131.0	1.5504	114.2	1.3523	124.4	1.5498	125.0	1.5311
MAR	72	72	124.4	1.5514	131.7	1.5434	120.1	1.3424	127.9	1.5369	127.1	1.5185
APR	72	72	124.4	1.5414	131.7	1.5314	119.7	1.3444	127.4	1.5183	128.5	1.5022
MAY	72	72	124.6	1.5314	132.5	1.5224	120.4	1.3370	124.5	1.5174	124.6	1.5007
JUN	72	72	124.4	1.5214	128.1	1.5134	121.1	1.3309	124.4	1.5044	127.6	1.5106
JUL	72	73	124.1	1.5114	128.4	1.5034	121.5	1.3274	127.4	1.5025	126.4	1.5219
AUG	72	73	124.4	1.5017	124.4	1.5094	121.4	1.3284	124.4	1.5188	126.6	1.5008
SEP	72	73	130.2	1.4954	129.0	1.5034	122.1	1.3212	124.9	1.5127	124.1	1.4945
OCT	72	73	131.0	1.4857	124.3	1.5004	122.1	1.3206	130.4	1.5044	124.8	1.4871
NOV	72	73	131.5	1.4757	124.7	1.5052	121.4	1.3237	132.7	1.4809	131.6	1.4663
DEC	72	73	134.9	1.4631	131.4	1.5037	123.0	1.3108	134.1	1.4650	133.0	1.4507
JAN	73	73	134.1	1.4510	130.9	1.5010	123.1	1.3098	133.4	1.4736	132.3	1.4583
FEB	73	73	134.9	1.4429	130.9	1.5014	122.4	1.3129	134.0	1.4685	132.9	1.4523
MAR	73	73	135.3	1.4383	132.4	1.5021	123.4	1.3063	134.7	1.4588	133.6	1.4447
APR	73	73	135.3	1.4347	132.7	1.5001	124.1	1.2992	134.7	1.4587	133.7	1.4439
MAY	73	73	134.3	1.4284	134.2	1.5014	124.2	1.2979	135.4	1.4470	134.7	1.4332
JUN	73	73	134.4	1.4264	135.2	1.5014	124.5	1.2945	135.2	1.4430	135.0	1.4293
JUL	73	74	134.2	1.4284	134.3	1.4993	125.2	1.2881	135.2	1.4423	135.1	1.4281
AUG	73	74	134.5	1.4204	136.5	1.4877	126.6	1.2791	138.1	1.4230	136.9	1.4098
SEP	73	74	134.1	1.4089	136.0	1.4834	126.6	1.2732	138.6	1.4175	137.4	1.4042
OCT	73	74	141.1	1.3797	137.3	1.4784	127.3	1.2667	140.2	1.4012	138.9	1.3889
NOV	73	74	141.7	1.3732	134.0	1.4721	127.9	1.2606	140.9	1.3947	139.6	1.3824
DEC	73	74	143.5	1.3565	140.9	1.4614	129.0	1.2498	142.4	1.3751	141.5	1.3637
JAN	74	74	144.5	1.3465	140.4	1.4464	124.6	1.2509	143.6	1.3582	142.2	1.3576
FEB	74	74	145.9	1.3340	141.4	1.4364	129.6	1.2446	144.4	1.3362	143.4	1.3461
MAR	74	74	147.2	1.3220	143.9	1.4199	130.4	1.2346	146.5	1.3114	144.9	1.3320
APR	74	74	144.0	1.3154	144.4	1.4044	131.0	1.2306	147.2	1.3348	145.6	1.3255
MAY	74	74	151.3	1.2865	154.1	1.3177	132.3	1.2186	151.9	1.2935	150.0	1.2869
JUN	74	74	152.3	1.2783	154.8	1.2954	134.3	1.2005	153.3	1.2822	151.4	1.2749
JUL	74	75	154.4	1.2603	160.0	1.2489	135.4	1.1905	155.7	1.2623	153.7	1.2559
AUG	74	75	157.3	1.2370	164.1	1.2224	135.4	1.1906	159.3	1.2336	156.9	1.2299
SEP	74	75	154.4	1.2288	167.0	1.2141	137.3	1.1745	160.3	1.2259	158.0	1.2214
OCT	74	75	161.3	1.2044	164.4	1.2044	137.4	1.1718	162.9	1.2063	160.4	1.2033
NOV	74	75	162.7	1.1963	169.3	1.1993	139.8	1.1529	164.2	1.1970	161.7	1.1932
DEC	74	75	163.5	1.1905	171.8	1.1824	141.9	1.1358	165.3	1.1886	163.0	1.1840
JAN	75	75	165.6	1.1755	177.3	1.1654	143.2	1.1257	168.2	1.1684	165.7	1.1647
FEB	75	75	164.0	1.1727	174.0	1.1534	144.0	1.1196	168.2	1.1682	165.4	1.1640
MAR	75	75	167.3	1.1634	174.7	1.1493	144.5	1.1141	169.4	1.1601	166.9	1.1563
APR	75	75	168.9	1.1524	177.0	1.1474	145.2	1.1100	170.7	1.1512	168.1	1.1477
MAY	75	75	170.4	1.1419	178.4	1.1384	145.4	1.1072	172.2	1.1411	169.6	1.1382
JUN	75	75	171.9	1.1320	177.5	1.1445	146.4	1.0982	173.2	1.1347	170.5	1.1316
JUL	75	76	172.4	1.1275	177.4	1.1445	147.0	1.0897	173.7	1.1313	171.1	1.1277
AUG	75	76	174.2	1.1170	178.1	1.1401	146.9	1.0794	175.1	1.1223	172.3	1.1201
SEP	75	76	174.1	1.1114	174.5	1.1337	147.6	1.0623	176.0	1.1165	173.2	1.1144
OCT	75	76	174.3	1.1042	174.5	1.1314	147.4	1.0537	177.0	1.1103	174.0	1.1089
NOV	75	76	177.4	1.0944	174.1	1.1339	147.5	1.0527	178.1	1.1034	175.0	1.1025
DEC	75	76	174.7	1.0844	181.4	1.1183	148.7	1.0841	174.3	1.0959	176.2	1.0949
JAN	76	76	179.1	1.0744	185.0	1.0974	149.4	1.0773	180.4	1.0892	177.3	1.0882
FEB	76	76	180.7	1.0772	185.3	1.0942	149.5	1.0785	181.7	1.0815	178.5	1.0812
MAR	76	76	181.4	1.0705	185.9	1.0925	149.7	1.0749	182.7	1.0755	179.4	1.0756
APR	76	76	181.2	1.0742	184.0	1.1039	149.4	1.0744	183.4	1.0689	178.6	1.0805
MAY	76	76	182.9	1.0644	184.2	1.0904	150.7	1.0649	183.4	1.0704	180.3	1.0703
JUN	76	76	183.0	1.0437	184.9	1.0864	151.7	1.0428	183.4	1.0689	180.6	1.0684

JUL	74	77	185.7	1.0443	149.5	1.0714	152.4	1.0547	186.5	1.0535	183.1	1.0538
AUG	74	77	185.5	1.0444	192.3	1.0543	153.2	1.0525	187.0	1.0510	183.6	1.0511
SEP	74	77	186.9	1.0415	146.0	1.0444	153.9	1.0478	188.5	1.0427	185.0	1.0431
OCT	74	77	186.2	1.0249	144.7	1.0433	154.9	1.0410	190.4	1.0322	186.8	1.0329
NOV	74	77	189.7	1.0255	145.3	1.0397	155.6	1.0347	191.0	1.0290	187.4	1.0296
DEC	74	77	190.4	1.0213	144.7	1.0323	158.5	1.0171	191.9	1.0238	188.5	1.0232
JAN	77	77	192.0	1.0134	148.4	1.0227	160.4	1.0052	193.6	1.0158	190.1	1.0149
FEB	77	77	192.7	1.0101	149.4	1.0142	159.9	1.0083	194.3	1.0115	190.8	1.0112
MAR	77	77	193.4	1.0044	202.7	1.0017	160.2	1.0065	195.4	1.0038	192.2	1.0040
APR	77	77	195.5	0.9554	202.7	1.0014	161.0	1.0016	197.1	0.9970	193.5	0.9974
MAY	77	77	194.9	0.9484	204.4	0.9441	162.1	0.9844	199.0	0.9876	195.3	0.9882
JUN	77	77	197.7	0.9443	204.5	0.9733	163.4	0.9436	200.1	0.9819	196.5	0.9820
JUL	77	77	194.2	0.9440	210.1	0.9444	164.7	0.9747	200.9	0.9784	197.2	0.9785
AUG	77	77	194.3	0.9744	210.2	0.9455	165.4	0.9733	201.7	0.9743	198.1	0.9742
SEP	77	77	200.1	0.9727	211.2	0.9414	167.9	0.9400	202.6	0.9701	199.1	0.9693

HISTORICAL INFLATION QUARTERLY INDICES

QTR	CY	AIRFRAME PRODUCTION			ENGINE PRODUCTION			AVIONICS PRODUCTION			AGGREGATE AIR VEHICLE EXCLUDING AVIONICS			AGGREGATE AIR VEHICLE INCLUDING AVIONICS		
		INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=
4	47	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0
4	47	100.1	1.9444	99.9	2.0321	100.3	1.6076	100.3	1.6076	100.1	1.9639	100.1	1.9639	100.1	1.9282	1.9282
4	47	102.0	1.9042	102.5	1.9404	101.2	1.5931	102.1	1.5931	102.1	1.9244	102.1	1.9244	102.1	1.8916	1.8916
1	68	102.5	1.8042	103.7	1.9580	103.0	1.5668	103.0	1.5668	102.8	1.9116	102.8	1.9116	102.8	1.8768	1.8768
2	68	102.4	1.9014	103.8	1.9540	103.5	1.5577	103.5	1.5577	102.7	1.9138	102.7	1.9138	102.7	1.8779	1.8779
4	68	103.8	1.8751	105.0	1.9344	104.6	1.5416	104.6	1.5416	104.1	1.8884	104.1	1.8884	104.1	1.8536	1.8536
4	68	107.0	1.8194	106.2	1.9127	105.8	1.5245	105.8	1.5245	105.4	1.8402	105.4	1.8402	105.4	1.8089	1.8089
1	69	108.4	1.7650	108.1	1.8793	106.9	1.5085	106.9	1.5085	106.4	1.8134	106.4	1.8134	106.4	1.7833	1.7833
2	69	109.3	1.7410	109.2	1.8690	107.4	1.4983	107.4	1.4983	107.3	1.7984	107.3	1.7984	107.3	1.7688	1.7688
3	69	110.3	1.7450	110.8	1.8334	108.4	1.4814	108.4	1.4814	110.4	1.7803	110.4	1.7803	110.4	1.7508	1.7508
4	69	113.4	1.7140	114.8	1.7394	109.7	1.4491	109.7	1.4491	114.3	1.7198	114.3	1.7198	114.3	1.6956	1.6956
1	70	115.0	1.6025	120.5	1.6854	111.1	1.4509	111.1	1.4509	116.2	1.6909	116.2	1.6909	115.7	1.6679	1.6679
2	70	115.7	1.6829	121.1	1.6770	112.7	1.4311	112.7	1.4311	116.9	1.6816	116.9	1.6816	116.4	1.6573	1.6573
4	70	117.4	1.6545	122.1	1.6427	114.4	1.4088	114.4	1.4088	118.6	1.6564	118.6	1.6564	118.2	1.6324	1.6324
4	70	119.9	1.6240	123.8	1.6402	115.9	1.3913	115.9	1.3913	120.7	1.6277	120.7	1.6277	120.2	1.6049	1.6049
1	71	119.4	1.6253	124.2	1.6221	117.3	1.3741	117.3	1.3741	121.0	1.6246	121.0	1.6246	120.6	1.6002	1.6002
2	71	120.4	1.6134	124.9	1.6005	117.9	1.3474	117.9	1.3474	122.0	1.6105	122.0	1.6105	121.6	1.5870	1.5870
3	71	121.1	1.6070	124.8	1.5768	118.0	1.3659	118.0	1.3659	122.8	1.5999	122.8	1.5999	122.3	1.5773	1.5773
4	71	122.7	1.5468	129.7	1.5454	117.5	1.3719	117.5	1.3719	124.2	1.5819	124.2	1.5819	123.5	1.5619	1.5619
1	72	125.0	1.5560	130.2	1.5514	119.4	1.3502	119.4	1.3502	126.3	1.5557	126.3	1.5557	125.6	1.5362	1.5362
2	72	128.7	1.5128	130.8	1.5524	120.5	1.3341	120.5	1.3341	129.1	1.5217	129.1	1.5217	128.3	1.5045	1.5045
3	72	128.9	1.5095	128.7	1.5774	121.6	1.3253	121.6	1.3253	128.9	1.5246	128.9	1.5246	128.2	1.5057	1.5057
4	72	133.1	1.4410	130.2	1.5599	122.3	1.3143	122.3	1.3143	126.5	1.4833	126.5	1.4833	131.5	1.4679	1.4679
1	73	134.8	1.4444	131.5	1.5448	123.1	1.3097	123.1	1.3097	134.0	1.4663	134.0	1.4663	132.9	1.4451	1.4451
2	73	134.0	1.4312	134.1	1.5148	124.3	1.2972	124.3	1.2972	135.6	1.4495	135.6	1.4495	134.4	1.4354	1.4354
3	73	134.0	1.4107	136.6	1.4872	125.9	1.2841	125.9	1.2841	137.7	1.4275	137.7	1.4275	136.5	1.4139	1.4139
4	73	142.1	1.3477	134.7	1.4433	126.1	1.2589	126.1	1.2589	141.3	1.3903	141.3	1.3903	140.0	1.3782	1.3782
1	74	145.9	1.3341	141.0	1.4310	128.6	1.2440	128.6	1.2440	142.0	1.3552	142.0	1.3552	143.5	1.3452	1.3452
2	74	150.5	1.2932	151.8	1.3372	132.5	1.2144	132.5	1.2144	150.8	1.3031	150.8	1.3031	149.0	1.2954	1.2954
3	74	156.7	1.2410	144.4	1.2356	136.0	1.1841	136.0	1.1841	156.4	1.2404	156.4	1.2404	156.2	1.2356	1.2356
4	74	162.5	1.1978	149.9	1.1953	139.8	1.1533	139.8	1.1533	164.1	1.1972	164.1	1.1972	161.7	1.1934	1.1934
1	75	164.3	1.1705	174.7	1.1494	143.0	1.1205	143.0	1.1205	168.6	1.1656	168.6	1.1656	165.1	1.1617	1.1617
2	75	170.4	1.1420	177.4	1.1433	145.9	1.1151	145.9	1.1151	172.0	1.1423	172.0	1.1423	169.4	1.1391	1.1391
3	75	174.0	1.1184	178.2	1.1394	147.5	1.0931	147.5	1.0931	174.9	1.1233	174.9	1.1233	172.2	1.1207	1.1207
4	75	177.4	1.0940	180.1	1.1273	147.9	1.0776	147.9	1.0776	175.1	1.1032	175.1	1.1032	175.1	1.1021	1.1021
1	76	180.5	1.0741	185.4	1.0955	149.4	1.0621	149.4	1.0621	181.4	1.0821	181.4	1.0821	178.4	1.0817	1.0817
2	76	182.3	1.0474	185.7	1.0934	150.7	1.0497	150.7	1.0497	183.1	1.0734	183.1	1.0734	179.8	1.0731	1.0731
3	76	184.0	1.0464	191.0	1.0580	153.2	1.0523	153.2	1.0523	187.3	1.0490	187.3	1.0490	183.9	1.0490	1.0490
4	76	189.8	1.0253	195.4	1.0384	154.3	1.0315	154.3	1.0315	191.1	1.0283	191.1	1.0283	187.6	1.0286	1.0286
1	77	192.8	1.0084	200.4	1.0134	160.2	1.0067	160.2	1.0067	194.5	1.0103	194.5	1.0103	191.1	1.0100	1.0100
2	77	196.7	0.9495	205.9	0.9465	162.3	0.9931	162.3	0.9931	198.7	0.9888	198.7	0.9888	195.1	0.9882	0.9882
3	77	190.2	0.9771	210.5	0.9445	164.1	0.9706	164.1	0.9706	201.7	0.9743	201.7	0.9743	198.1	0.9740	0.9740

HISTORICAL INFLATION
FISCAL YEAR INDICES

	AIRCRAFT PRODUCTION		ENGINE PRODUCTION		AUTOMOBILES PRODUCTION		AGGREGATE AIR VEHICLE EXCLUDING AVIONICS		AGGREGATE AIR VEHICLE INCLUDING AVIONICS	
	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR	INDEX	FACTOR
	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=	CY67=	FY77=
69	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000	100.0	1.0000
70	101.7	1.9120	102.5	1.9413	102.0	1.5805	101.9	1.9282	101.9	1.8934
71	107.1	1.8170	107.1	1.8957	104.2	1.5181	107.1	1.8345	107.0	1.8031
72	113.6	1.7130	117.3	1.7317	110.4	1.4579	114.4	1.7173	114.0	1.6921
73	119.5	1.6292	124.5	1.6310	114.4	1.3852	120.4	1.6296	120.2	1.6059
74	124.4	1.5651	130.0	1.5814	118.9	1.3564	125.6	1.5843	124.9	1.5445
75	133.2	1.4411	131.1	1.5489	122.4	1.3125	136.7	1.4804	131.8	1.4647
76	144.1	1.3505	142.3	1.4274	129.0	1.2494	143.7	1.3675	142.2	1.3568
77	144.0	1.1449	172.1	1.1797	141.4	1.1402	152.8	1.1853	163.4	1.1813
78	174.6	1.0497	182.3	1.1130	148.0	1.0828	174.4	1.0951	176.4	1.0941
79	184.0	1.0464	191.9	1.0580	153.2	1.0523	187.3	1.0490	183.9	1.0493
80	194.6	1.0000	203.1	1.0000	161.2	1.0000	196.5	1.0000	193.0	1.0000

A P P E N D I X H

MONTHLY DATA FOR THE HISTORICAL INFLATION PROGRAM - -
RAW MATERIAL PORTION ONLY

MATERIALS ONLY

H 2

MATERIALS ONLY

H 3

MATERIALS ONLY

[illegible]

APPENDIX G

ANNUAL DATA FOR THE HISTORICAL INFLATION PROGRAM - -
RAW MATERIAL PORTION ONLY

MATERIALS ONLY

MATERIAL COST DATA

APPENDIX I

HISTORICAL INFLATION INDICES :

RAW MATERIAL PORTION ONLY.

HISTORICAL INFLATION 1914-1958 INDICES

RAW MATERIAL PORTION ONLY

CY	AIRFRAME PRODUCTION			ENGINE PRODUCTION			AGGREGATE AIR VEHICLE EXCLUDING AVIONICS		
	INDEX CY47=	FACTOR FY77=	INDEX CY47=	INDEX CY47=	FACTOR FY77=	INDEX CY47=	INDEX CY47=	FACTOR FY77=	
47	100.0	1.0000	100.0	100.0	1.0000	100.0	100.0	1.0000	
48	17.0	2.6351	36.2	36.2	3.0106	41.3	41.3	6.7771	
49	19.2	2.3337	41.2	41.2	2.6457	44.1	44.1	6.9562	
50	18.3	2.3224	41.5	41.5	2.6251	44.2	44.2	6.4376	
51	20.6	2.1803	43.7	43.7	2.4626	45.7	45.7	6.2985	
52	23.1	1.9412	48.7	48.7	2.2385	48.8	48.8	6.0530	
53	22.4	1.9665	44.7	44.7	2.2345	48.0	48.0	6.0624	
54	23.4	1.9112	50.3	50.3	2.1471	49.4	49.4	6.0084	
55	23.6	1.8953	50.7	50.7	2.1503	49.7	49.7	1.9921	
56	25.4	1.7665	54.1	54.1	2.0135	51.8	51.8	1.8600	
57	27.4	1.6152	54.8	54.8	1.8537	54.4	54.4	1.7183	
58	27.9	1.6059	60.0	60.0	1.8172	55.0	55.0	1.6803	

HISTORICAL INFLATION
CALENDAR YEAR INDICES

RAW MATERIAL PORTION ONLY

	AIRCRAFT PRODUCTION			ENGINE PRODUCTION			AVIONICS PRODUCTION			AGGREGATE AIR VEHICLE EXCLUDING AVIONICS			AGGREGATE AIR VEHICLE INCLUDING AVIONICS		
	INDEX CY77E	FACTOR FY77E	INDEX CY77E	INDEX CY77E	FACTOR FY77E	INDEX CY77E	INDEX CY77E	FACTOR FY77E	INDEX CY77E	FACTOR FY77E	INDEX CY77E	FACTOR FY77E	INDEX CY77E	FACTOR FY77E	INDEX CY77E
69	27.7	1.0000	1.0000	54.4	1.0000	1.0000	31.5	1.0000	34.4	1.0000	34.4	1.0000	34.4	1.0000	34.4
70	25.4	1.0160	1.0293	54.3	1.0293	1.0293	31.3	1.0293	34.5	1.0293	34.5	1.0293	34.5	1.0293	34.5
71	26.2	1.0366	1.0442	57.0	1.0442	1.0442	30.9	1.0442	34.6	1.0442	34.6	1.0442	34.6	1.0442	34.6
72	25.6	1.0710	1.0812	57.0	1.0812	1.0812	30.9	1.0812	34.6	1.0812	34.6	1.0812	34.6	1.0812	34.6
73	24.5	1.0846	1.0922	55.4	1.0922	1.0922	30.5	1.0922	34.6	1.0922	34.6	1.0922	34.6	1.0922	34.6
74	23.7	1.0947	1.1072	53.2	1.1072	1.1072	30.1	1.1072	34.6	1.1072	34.6	1.1072	34.6	1.1072	34.6
75	23.5	1.1091	1.1243	49.8	1.1243	1.1243	30.0	1.1243	34.6	1.1243	34.6	1.1243	34.6	1.1243	34.6
76	23.4	1.1207	1.1394	49.0	1.1394	1.1394	30.0	1.1394	34.6	1.1394	34.6	1.1394	34.6	1.1394	34.6
77	24.1	1.1540	1.1746	52.4	1.1746	1.1746	31.5	1.1746	34.6	1.1746	34.6	1.1746	34.6	1.1746	34.6
78	24.5	1.1844	1.2084	54.3	1.2084	1.2084	31.2	1.2084	34.6	1.2084	34.6	1.2084	34.6	1.2084	34.6
79	24.2	1.2070	1.2343	57.4	1.2343	1.2343	31.7	1.2343	34.6	1.2343	34.6	1.2343	34.6	1.2343	34.6
80	24.2	1.2081	1.2343	55.3	1.2343	1.2343	31.4	1.2343	34.6	1.2343	34.6	1.2343	34.6	1.2343	34.6
81	24.2	1.2120	1.2404	47.7	1.2404	1.2404	32.3	1.2404	34.6	1.2404	34.6	1.2404	34.6	1.2404	34.6
82	24.6	1.2453	1.2743	45.9	1.2743	1.2743	32.4	1.2743	34.6	1.2743	34.6	1.2743	34.6	1.2743	34.6
83	27.3	1.2630	1.2946	44.2	1.2946	1.2946	32.9	1.2946	34.6	1.2946	34.6	1.2946	34.6	1.2946	34.6
84	34.2	1.3120	1.3450	42.0	1.3450	1.3450	35.1	1.3450	34.6	1.3450	34.6	1.3450	34.6	1.3450	34.6
85	34.1	1.3142	1.3482	45.7	1.3482	1.3482	36.4	1.3482	34.6	1.3482	34.6	1.3482	34.6	1.3482	34.6
86	42.2	1.3413	1.3733	100.4	1.3733	1.3733	36.4	1.3733	34.6	1.3733	34.6	1.3733	34.6	1.3733	34.6

HISTORICAL INFLATION MONTHLY INDICES

RAW MATERIAL PORTION ONLY

				AIRCRAFT PRODUCTION				ENGINE PRODUCTION				AVIONICS PRODUCTION				AGGREGATE AIR VEHICLE EXCLUDING AVIONICS				AGGREGATE AIR VEHICLE INCLUDING AVIONICS			
				INDEX CY67=	FACTOR FY77=			INDEX CY67=	FACTOR FY77=			INDEX CY67=	FACTOR FY77=			INDEX CY67=	FACTOR FY77=			INDEX CY67=	FACTOR FY77=		
				100.0	1.0000			100.0	1.0000			100.0	1.0000			100.0	1.0000			100.0	1.0000		
				---	---			---	---			---	---			---	---			---	---		
JUL	67	AR	24.0	52.4	2.0792			31.4	1.1440			30.3	1.9478			30.4	1.9478			30.4	1.9478		
AUG	67	AR	24.1	52.4	2.0792			31.4	1.1440			30.4	1.9478			30.5	1.9478			30.5	1.9478		
SEP	67	AR	24.1	52.4	2.0792			31.3	1.1440			30.4	1.9478			30.5	1.9478			30.5	1.9478		
OCT	67	AR	24.2	53.7	2.0302			31.3	1.1440			30.7	1.9478			30.4	1.9478			30.4	1.9478		
NOV	67	AR	24.3	54.1	2.0134			31.2	1.1440			30.9	1.9478			30.9	1.9478			30.9	1.9478		
DEC	67	AR	24.3	54.1	2.0134			31.5	1.1440			31.0	1.9478			31.0	1.9478			31.0	1.9478		
JAN	68	AR	24.5	54.1	2.0134			31.4	1.1440			31.1	1.9478			31.1	1.9478			31.1	1.9478		
FEB	68	AR	24.6	54.5	2.0013			31.3	1.1440			31.2	1.9478			31.2	1.9478			31.2	1.9478		
MAR	68	AR	24.6	54.5	2.0013			31.2	1.1440			31.2	1.9478			31.2	1.9478			31.2	1.9478		
APR	68	AR	24.5	54.4	2.0035			31.3	1.1440			31.2	1.9478			31.2	1.9478			31.2	1.9478		
MAY	68	AR	24.3	54.4	2.0044			31.3	1.1440			31.0	1.9478			31.0	1.9478			31.0	1.9478		
JUN	68	AR	24.5	54.4	2.0044			31.2	1.1440			31.1	1.9478			31.1	1.9478			31.1	1.9478		
JUL	68	AR	24.6	54.4	2.0044			31.2	1.1440			31.3	1.9478			31.3	1.9478			31.3	1.9478		
AUG	68	AR	24.7	54.4	2.0044			31.2	1.1440			31.3	1.9478			31.3	1.9478			31.3	1.9478		
SEP	68	AR	24.4	54.4	2.0037			31.2	1.1440			31.1	1.9478			31.1	1.9478			31.1	1.9478		
OCT	68	AR	24.5	54.4	2.0034			31.2	1.1440			31.1	1.9478			31.1	1.9478			31.1	1.9478		
NOV	68	AR	24.5	54.1	2.0135			31.2	1.1440			31.1	1.9478			31.1	1.9478			31.1	1.9478		
DEC	68	AR	24.5	54.1	2.0131			31.2	1.1440			31.1	1.9478			31.1	1.9478			31.1	1.9478		
JAN	69	AR	24.6	55.7	1.9471			31.2	1.1440			31.5	1.8727			31.5	1.8727			31.5	1.8727		
FEB	69	AR	25.1	55.7	1.9471			31.2	1.1440			31.9	1.8445			31.9	1.8445			31.9	1.8445		
MAR	69	AR	25.2	55.8	1.9544			31.6	1.1770			32.0	1.8445			32.0	1.8445			32.0	1.8445		
APR	69	AR	25.4	56.0	1.9443			31.7	1.1746			32.2	1.8343			32.2	1.8343			32.2	1.8343		
MAY	69	AR	25.5	56.1	1.9440			31.7	1.1746			32.3	1.8283			32.3	1.8283			32.3	1.8283		
JUN	69	AR	25.6	57.2	1.9040			31.7	1.1746			32.6	1.8133			32.5	1.8133			32.5	1.8133		
JUL	69	AR	25.6	57.2	1.9040			31.7	1.1746			32.6	1.8105			32.5	1.8105			32.5	1.8105		
AUG	69	AR	25.8	57.2	1.9040			31.7	1.1746			32.7	1.8040			32.6	1.8040			32.6	1.8040		
SEP	69	AR	25.8	56.9	1.9147			31.9	1.1677			32.5	1.8155			32.5	1.8155			32.5	1.8155		
OCT	69	AR	25.7	61.2	1.7812			31.9	1.1677			33.4	1.7598			33.4	1.7598			33.4	1.7598		
NOV	69	AR	25.8	61.0	1.7844			32.0	1.1619			33.4	1.7509			33.5	1.7509			33.5	1.7509		
DEC	69	AR	26.1	63.8	1.7049			31.9	1.1654			33.5	1.7145			34.2	1.7145			34.2	1.7145		
JAN	70	AR	26.2	65.1	1.6735			31.4	1.1793			34.5	1.6908			34.5	1.6908			34.5	1.6908		
FEB	70	AR	26.2	65.1	1.6735			31.4	1.1793			34.5	1.6908			34.5	1.6908			34.5	1.6908		
MAR	70	AR	26.1	65.1	1.6737			31.4	1.1793			34.5	1.6908			34.5	1.6908			34.5	1.6908		
APR	70	AR	26.2	65.1	1.6747			31.7	1.1746			34.5	1.6908			34.5	1.6908			34.5	1.6908		
MAY	70	AR	26.3	65.1	1.6720			31.4	1.1840			34.5	1.6908			34.5	1.6908			34.5	1.6908		
JUN	70	AR	26.3	65.2	1.6720			31.4	1.1840			34.5	1.6908			34.5	1.6908			34.5	1.6908		
JUL	70	AR	26.3	65.2	1.6724			31.4	1.1840			34.5	1.6908			34.5	1.6908			34.5	1.6908		
AUG	70	AR	26.3	65.2	1.6724			31.4	1.1840			34.5	1.6908			34.5	1.6908			34.5	1.6908		
SEP	70	AR	26.2	65.4	1.6654			32.0	1.1642			34.9	1.6908			34.6	1.6908			34.6	1.6908		
OCT	70	AR	26.2	65.4	1.6654			32.0	1.1642			34.9	1.6908			34.6	1.6908			34.6	1.6908		
NOV	70	AR	26.2	65.4	1.6654			32.1	1.1642			34.9	1.6908			34.6	1.6908			34.6	1.6908		
DEC	70	AR	26.2	65.4	1.6654			32.1	1.1642			34.9	1.6908			34.6	1.6908			34.6	1.6908		
JAN	71	AR	26.1	65.9	1.6445			32.4	1.1495			34.9	1.6908			34.7	1.6908			34.7	1.6908		
FEB	71	AR	26.0	65.9	1.6445			32.5	1.1495			34.9	1.6908			34.6	1.6908			34.6	1.6908		
MAR	71	AR	26.1	66.4	1.6444			32.7	1.1395			34.9	1.6908			34.9	1.6908			34.9	1.6908		
APR	71	AR	26.4	66.4	1.6425			32.5	1.1441			35.3	1.6713			35.1	1.6713			35.1	1.6713		

MAY	76	76	41.5	1.0740	94.9	1.1017	36.2	1.0275	54.3	1.0082	52.5	1.0040
JUN	76	76	42.1	1.0733	95.0	1.1006	36.4	1.0240	54.4	1.0783	52.9	1.0745
JUL	76	77	42.3	1.0692	99.4	1.0927	36.4	1.0240	55.0	1.0743	53.1	1.0706
AUG	76	77	42.7	1.0497	102.0	1.0645	36.4	1.0231	55.9	1.0573	53.9	1.0550
SEP	76	77	43.1	1.0154	103.2	1.0521	36.5	1.0204	57.2	1.0325	55.1	1.0317
OCT	76	77	43.1	1.0154	103.2	1.0520	36.6	1.0149	57.3	1.0317	55.2	1.0307
NOV	76	77	43.1	1.0176	103.2	1.0557	36.7	1.0152	57.2	1.0325	55.2	1.0313
DEC	76	77	43.0	1.0194	103.2	1.0559	36.7	1.0134	57.1	1.0341	55.1	1.0327
JAN	77	77	43.9	1.0204	105.5	1.0323	37.1	1.0023	57.5	1.0255	55.8	1.0239
FEB	77	77	44.0	1.0166	106.2	1.0254	37.2	0.9997	57.5	1.0214	55.8	1.0200
MAR	77	77	44.4	1.0049	104.1	0.9991	37.2	0.9947	56.6	1.0055	56.6	1.0051
APR	77	77	45.4	0.9475	104.2	0.9388	37.4	0.9847	57.4	0.9918	57.4	0.9920
MAY	77	77	45.5	0.9441	112.4	0.9477	37.4	0.9647	58.1	0.9785	58.1	0.9795
JUN	77	77	45.4	0.9744	113.5	0.9406	37.4	0.9338	58.5	0.9708	58.5	0.9723
JUL	77	77	45.6	0.9435	114.3	0.9536	37.4	0.9655	58.5	0.9711	58.5	0.9727
AUG	77	77	45.6	0.9418	114.3	0.9535	37.4	0.9647	58.6	0.9700	58.6	0.9716
SEP	77	77	45.5	0.9458	113.4	0.9404	38.0	0.9800	58.3	0.9753	58.3	0.9757

HISTORICAL INFLATION QUARTERLY INDICES

RAW MATERIAL PORTION ONLY

QTR	CY	AIRCRAFT PRODUCTION		ENGINE PRODUCTION		AUTONICS PRODUCTION		AGGREGATE AIR VEHICLE EXCLUDING AUTONICS		AGGREGATE AIR VEHICLE INCLUDING AUTONICS	
		INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	FACTOR FY77=
1	47	24.1	1.8624	52.4	2.0743	31.4	1.1450	30.4	1.9455	30.5	1.8672
2	47	24.3	1.8472	54.0	2.0192	31.3	1.1480	30.9	1.9140	30.9	1.8404
3	47	24.5	1.8273	54.3	2.0051	31.3	1.1486	31.2	1.8962	31.2	1.8252
4	47	24.6	1.8327	54.4	2.0041	31.3	1.1496	31.1	1.8993	31.1	1.8279
5	47	24.6	1.8232	54.5	2.0004	31.2	1.1436	31.2	1.8920	31.2	1.8222
6	47	24.5	1.8302	54.2	2.0100	31.2	1.1426	31.1	1.8999	31.1	1.8290
7	47	25.0	1.7910	55.7	1.9555	31.4	1.1436	31.0	1.8955	31.0	1.7891
8	47	25.5	1.7570	54.4	1.9313	31.7	1.1746	32.4	1.8253	32.3	1.7614
9	47	25.6	1.7674	57.1	1.9044	31.7	1.1727	32.4	1.8100	32.5	1.7678
10	47	25.9	1.7334	62.0	1.7523	32.0	1.1442	33.9	1.7435	33.7	1.6885
11	47	26.1	1.7144	65.1	1.6734	31.7	1.1746	34.9	1.6975	34.5	1.6495
12	47	26.3	1.7044	65.1	1.6734	31.7	1.1754	34.9	1.6916	34.4	1.6444
13	47	26.3	1.7042	65.2	1.6702	31.9	1.1473	35.0	1.6901	34.6	1.6420
14	47	26.2	1.7100	65.7	1.6540	32.1	1.1412	35.0	1.6887	34.7	1.6399
15	47	26.1	1.7194	66.1	1.6484	32.4	1.1443	35.0	1.6897	34.7	1.6386
16	47	26.4	1.6982	67.4	1.6144	32.4	1.1440	35.5	1.6634	35.2	1.6163
17	47	26.4	1.6873	64.7	1.5267	32.5	1.1449	35.4	1.6501	35.5	1.6041
18	47	26.4	1.7007	64.5	1.5498	32.3	1.1413	35.7	1.6534	35.4	1.6076
19	47	26.4	1.6961	64.7	1.5462	32.5	1.1465	35.4	1.6493	35.5	1.6033
20	47	26.6	1.6821	67.5	1.4153	32.7	1.1395	35.7	1.6541	35.4	1.6066
21	47	26.7	1.6412	63.6	1.4153	32.7	1.1309	34.9	1.6914	34.7	1.6395
22	47	26.7	1.6420	63.4	1.7131	32.5	1.1447	34.4	1.6958	34.6	1.6440
23	47	26.7	1.6750	64.1	1.6095	32.4	1.1402	35.0	1.6855	34.4	1.6344
24	47	27.1	1.6555	66.2	1.6477	32.9	1.1329	35.4	1.6520	35.5	1.6139
25	47	27.3	1.6414	67.1	1.6251	32.9	1.1297	35.1	1.6347	35.6	1.5862
26	47	28.0	1.6013	67.4	1.6170	33.1	1.1240	35.7	1.6077	35.4	1.5637
27	47	28.4	1.5045	69.7	1.5440	32.4	1.1045	35.7	1.5283	34.1	1.4914
28	47	32.7	1.3710	75.9	1.3411	34.4	1.0749	42.9	1.3756	42.1	1.3511
29	47	34.4	1.2302	89.4	1.2143	35.6	1.0448	48.2	1.2253	47.0	1.2116
30	47	37.4	1.1910	93.0	1.1715	36.4	1.0184	49.9	1.1829	48.6	1.1706
31	47	38.5	1.1430	97.1	1.1210	36.4	1.0103	51.5	1.1463	50.1	1.1363
32	47	34.9	1.1520	94.2	1.1331	34.5	1.0199	51.6	1.1442	50.1	1.1351
33	47	30.5	1.1345	95.4	1.1125	36.2	1.0249	51.9	1.1374	50.4	1.1298
34	47	30.4	1.1312	94.3	1.1557	36.0	1.0350	51.4	1.1411	50.2	1.1335
35	47	40.3	1.1116	94.7	1.1040	34.1	1.0302	53.3	1.1083	51.6	1.1024
36	47	41.5	1.0400	94.9	1.1017	36.3	1.0246	54.3	1.0884	52.5	1.0945
37	47	43.0	1.0614	101.5	1.0735	36.4	1.0225	55.0	1.0544	54.1	1.0523
38	47	44.1	1.0173	103.2	1.0554	36.7	1.0152	57.2	1.0328	55.1	1.0316
39	47	44.1	1.0161	106.0	1.0193	37.2	1.0006	58.1	1.0174	56.0	1.0163
40	47	45.5	0.9440	111.8	0.9743	37.4	0.9944	60.3	0.9803	58.0	0.9812
41	47	45.6	0.9437	114.0	0.9567	37.4	0.9902	60.4	0.9721	58.4	0.9733

HISTORICAL INFLATION
FISCAL YEAR INDICES

RAW MATERIAL PORTION ONLY

	AIRCRAFT PRODUCTION			ENGINE PRODUCTION			AVIONICS PRODUCTION			AGGREGATE AIR VEHICLE EXCLUDING AVIONICS			AGGREGATE AIR VEHICLE INCLUDING AVIONICS		
	INDEX CY67=	FACTOR FY77=	INDEX CY67=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	INDEX CY67=	FACTOR FY77=	INDEX CY67=	INDEX CY67=	FACTOR FY77=	INDEX CY67=
69	100.0	1.0000	100.0	100.0	1.0000	100.0	100.0	1.0000	100.0	100.0	1.0000	100.0	100.0	1.0000	100.0
70	24.3	1.8423	53.4	31.3	1.1880	31.3	30.9	1.9136	30.9	30.9	1.9136	30.9	30.9	1.8400	30.9
71	24.9	1.8003	55.2	31.4	1.1841	31.4	31.4	1.8677	31.4	31.4	1.8677	31.4	31.4	1.8000	31.4
72	24.0	1.7240	62.3	31.4	1.1717	31.4	34.1	1.7344	34.1	34.1	1.7344	34.1	34.1	1.6816	34.1
73	24.2	1.7080	64.1	32.2	1.1551	32.2	35.1	1.6630	35.1	35.1	1.6630	35.1	35.1	1.6341	35.1
74	24.5	1.6940	64.3	32.5	1.1460	32.5	35.6	1.6517	35.6	35.6	1.6517	35.6	35.6	1.6054	35.6
75	24.4	1.6791	64.4	32.7	1.1394	32.7	35.1	1.6610	35.1	35.1	1.6610	35.1	35.1	1.6303	35.1
76	20.4	1.5225	70.4	33.4	1.1094	33.4	38.7	1.5296	38.7	38.7	1.5296	38.7	38.7	1.4926	38.7
77	37.9	1.1635	93.4	34.4	1.0232	34.4	50.3	1.1738	50.3	50.3	1.1738	50.3	50.3	1.1626	50.3
78	40.2	1.1139	94.8	34.1	1.0297	34.1	52.6	1.1186	52.6	52.6	1.1186	52.6	52.6	1.1123	52.6
79	43.0	1.0414	101.5	34.4	1.0225	34.4	58.0	1.0544	58.0	58.0	1.0544	58.0	58.0	1.0523	58.0
80	44.8	1.0000	104.0	37.2	1.0000	37.2	59.1	1.0000	59.1	59.1	1.0000	59.1	59.1	1.0000	59.1

APPENDIX J

SENSITIVITY ANALYSIS .

APPENDIX J

SENSITIVITY ANALYSIS

Many considerations are important in the construction of Historical Indices for tracking purposes. These certainly include:

a. The items chosen to comprise the index:

(1) How representative these items are.

(2) How closely these items can approximate the actual materials used, if precise material indices are not obtainable.

(3) The number of items used, and the detail in the analysis which produced the indices.

b. Determination of the percent contribution to cost - "Cost Drivers"

c. The weighting factors employed in the overall analysis.

An obvious problem confronting those who must determine the validity of an index developed for historical tracking purposes is the aggregate labor/material weighting factors. In tracking major weapons systems, often times it is stated as say 40/60 - that is 40 percent material and 60 percent labor - as percentage contributions to cost. Because it is difficult for analysts to determine the "correct" aggregate mix of labor and material when external to the project, the aggregate split is obviously of interest.

The value for any index depends, basically, on three factors:

a. The number of factors employed, and the quality and detail contained in the analysis.

b. The values of each component of cost used in the construction of the index.

c. The weights, or levels of importance, given the factors, individually and collectively.

ANALYSIS: The objective of the sensitivity analysis which we performed is to shed some light on the aggregate material/labor split, which has been a controversial issue for some time.

Through the use of a set of recursive linear equations, the effect on the historical inflation index for airframe resulting from varying the aggregate weighting scheme was calculated, in both raw and percentage terms. The calculations were made using a Wang system 2200 mini computer, and a sample printout follows. The results provide strong evidence that the key to a successful index resides in item (1), the number of factors employed, and the quality and detail in the analysis used in preparing the index. In retrospect, because wages are often tied to the Wholesale Price Index, or other price indices, in labor agreements, it is not surprising that aggregate weighting percentages for labor and material might not be an extremely sensitive issue. However, the calculations provide strong support for the position that the identification of cost components and the depth and quality of detail in an analysis are of paramount importance, when developing an index to be used in controlling the cost of a major weapon system.

SENSITIVITY ANALYSIS
 AIRFRAME
 TO GROSS WEIGHTING FACTORS

YEAR 1972

GROSS MRTL	GROSS LABOR	PURE MRTL	PURE LABOR	NEW INDX	CURR INDX	PERCENT CHANGE
.378	.6226	.2411	.7588	1.289	1.289	0.0
.266	.8066	.1068	.8931	1.3222	1.2896	2.58
.256	.7566	.1408	.8591	1.3139	1.2896	1.93
.306	.7066	.1777	.8222	1.3048	1.2896	1.23
.356	.6566	.2175	.7824	1.2951	1.2896	0.47
.406	.6066	.2603	.7396	1.2846	1.2896	- 0.33
.456	.5566	.3039	.6946	1.2734	1.2896	- 1.20
.506	.5066	.3545	.6455	1.2615	1.2896	- 2.12
.556	.4566	.4039	.5946	1.2489	1.2896	- 3.10
.606	.4066	.4603	.5396	1.2356	1.2896	- 4.14
.656	.3566	.5175	.4824	1.2215	1.2896	- 5.23
.706	.3066	.5777	.4222	1.2068	1.2896	- 6.37
.756	.2566	.6408	.3591	1.1913	1.2896	- 7.57
.806	.2066	.7068	.2931	1.1751	1.2896	- 8.83
SIC 3721 = 4.740 SIC 3723.9 = 4.370 NEW MRTL IND = .2066						